



US009913676B2

(12) **United States Patent**  
**Schlachter et al.**

(10) **Patent No.:** **US 9,913,676 B2**  
(45) **Date of Patent:** **Mar. 13, 2018**

(54) **MILLED BONE GRAFT MATERIALS AND METHODS OF USE**

(71) Applicant: **Warsaw Orthopedic, Inc.**, Warsaw, IN (US)

(72) Inventors: **Kelly W. Schlachter**, Mason, TN (US); **Daniel A. Shimko**, Germantown, TN (US); **Kerem N. Kalpakci**, Memphis, TN (US); **Erick Vasquez**, Memphis, TN (US); **David R. Kaes**, Toms River, NJ (US); **Subhabrata Bhattacharyya**, Metuchen, NJ (US)

(73) Assignee: **Warsaw Orthopedic, Inc.**, Warsaw, IN (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/941,033**

(22) Filed: **Nov. 13, 2015**

(65) **Prior Publication Data**

US 2016/0135954 A1 May 19, 2016

**Related U.S. Application Data**

(60) Provisional application No. 62/079,931, filed on Nov. 14, 2014, provisional application No. 62/079,916, (Continued)

(51) **Int. Cl.**  
**A61F 2/28** (2006.01)  
**A61B 17/88** (2006.01)  
(Continued)

(52) **U.S. Cl.**  
CPC ..... **A61B 17/8816** (2013.01); **A61B 17/8805** (2013.01); **A61F 2/28** (2013.01);  
(Continued)

(58) **Field of Classification Search**

CPC ..... A61F 2/28; A61F 2002/2835; A61F 2/30942; A61F 2/4601; A61F 2002/30057;

(Continued)

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

6,458,375 B1 \* 10/2002 Gertzman ..... A61F 2/28 424/422

9,333,082 B2 \* 5/2016 Wei ..... A61K 35/32  
(Continued)

**OTHER PUBLICATIONS**

International Preliminary Report on Patentability of the Patent Cooperation Treaty (PCT), International Bureau of WIPO, dated May 16, 2017 of International PCT Application No. PCT/US2015/060619 filed on Nov. 13, 2015.

(Continued)

*Primary Examiner* — Alvin Stewart

(57) **ABSTRACT**

A bone material for hydration with a liquid is provided, the bone material comprising a coherent mass of milled and demineralized bone fibers, the coherent mass having no binder disposed in or on the coherent mass. In some embodiments, a bone material for hydration with a liquid is provided, the bone material comprising a coherent mass of cartridge milled, lyophilized and demineralized bone fibers, the coherent mass having no binder on the coherent mass. In some embodiments, a method of implanting a bone material is provided, the method comprising contacting the bone material with a liquid, the bone material comprising a coherent mass of cartridge milled, lyophilized and demineralized bone fibers, the coherent mass having no binder disposed in or on the coherent mass; molding the bone material into a shape to implant the bone material; and implanting the bone material at the target tissue site.

**17 Claims, 18 Drawing Sheets**

